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FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER

PHAM, HAI CHI

ART UNIT PAPER NUMBER

2861

DATE MAILED: 10/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/522,294

Applicant(s)

KATO, MANABU

Examiner

Hai C Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 12-18, 40 and 42-79 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-10, 56, 63, 67 and 74 is/are allowed.
- 6) ☒ Claim(s) 12-18, 40, 42-55, 57-62, 64-66, 68-73 and 75-79 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claims 71 and 78 are objected to because of the following informalities:

Claim 71:

- Line 1, "according to claim 69" should read --according to claim 70--, otherwise claim 71 would be an exact duplicate of claim 69.

Claim 78:

- Line 1, "according to claim 76" should read --according to claim 77--, otherwise claim 78 would be an exact duplicate of claim 76.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 40, 42-43, 48, 58, 65, 70-71, 73/70, 77-78 rejected under 35 U.S.C. 102(b) as being anticipated by Kitamura (U.S. 4,424,442).

Kitamura discloses a multi-beam scanning apparatus comprising light source (1) having a plurality of light emitting sections (1a, 1b, 1c), a light deflector (polygon mirror 3) for deflecting a plurality of light beams emitted respectively from the plurality of light emitting sections of said light source, a scanning optical system (f- θ lens 4) for focusing

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the plurality of light beams deflected by said light deflector on a surface to be scanned (surface of the photosensitive drum 6), a photodetector (5) for controlling a timing of a start of scanning of the plurality of light beams by detecting at least one of the plurality of light beams deflected by said light deflector as at least one detection light beam, and a detection optical element (lens 10) for converging the at least one detection light beam and leading it to said photodetector (see Fig. 4A), said detection optical element (10) having a refractive power in the main-scanning direction (col. 2, lines 21-30), wherein said detection optical element has its optical surfaces arranged orthogonally relative to an arrangement direction of the at least one detection light beam (the optical axis 11 of the cylindrical lens 10 being coincident with the primary scanning direction and parallel to the principal rays of incident lights 3a, 3b, 3c, and the surface 5a of the photodetector 5 being orthogonal to the optical axis 11) (col. 3, lines 17-35).

With respect to claims 40, 43, 48, 58, 65, 70-71, 73/70, 77-78, Kitamura further teaches the detection optical element (10) comprising an anamorphic lens, at least one image carrier (photosensitive drum 6) being arranged on the at least one surface to be scanned, the at least one detection light beam not passing through said scanning optical system (col. 2, lines 21-30), an incident optical system (2) for leading the plural beams to the light deflector, as well as all the plural beams being detected by the photodetector.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 12-13, 18, 49-50, 55, 57, 59, 64, 66, 68-69, 72, 73/72, 75-76, 79 rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Ohmori et al. (U.S. 4,978,977).

Kitamura discloses all the basic limitations of the claimed invention except for two lenses being disposed in front of the photodetector, and the photodetector being held optically equivalent with respect to the center of the scanning width.

However, Ohmori et al. discloses a laser scanning apparatus, which comprises an SOS sensor (10) for determining the start of scanning position of the laser beam is held equivalent to the surface of the photosensitive member (8), a first cylindrical lens (11) and a second cylindrical lens (12) disposed in front of the SOS sensor for converging the detection beam onto the surface of the SOS sensor, the surfaces of the two lenses being held orthogonal to the principal ray of the detection beam (Fig. 4). Ohmori et al. also teaches the second cylindrical lens (12) being replaced by a usual condenser lens having power in both scanning directions (col. 3, lines 55-68).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the pair of detection lenses as taught by Ohmori et al. in the device of Kitamura. The motivation for doing so would have been to precisely focus the detection beam onto the sensor as well as to diminish synchronization error as suggested by Ohmori et al.

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6. Claims 15, 52, 60, 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Ohmori et al., as applied to claims 12, 49 above, and further in view of Kamikubo (U.S. 6,124,962).

Kitamura, as modified by Ohmori et al., discloses all the basic limitations of the claimed invention except for the scanning optical system comprising a refraction optical element and a diffraction optical element.

However, Kamikubo discloses a scanning optical system whose scanning lenses comprise refraction lens elements with a diffraction lens structure for compensating compensates for the lateral chromatic aberration caused by the refraction lens elements. Kamikubo further teaches the scanning optical system would include a plurality of light sources emitting lights at different wavelengths.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the refraction and diffraction lens elements as taught by Kamikubo in the modified device of Kitamura. Doing so would eliminate the chromatic aberration when a light source emitting a plurality of light beams of different wavelengths are used.

7. Claims 45, 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Kamikubo.

Kitamura discloses all the basic limitations of the claimed invention except for the scanning optical system comprising a refraction optical element and a diffraction optical element.

However, Kamikubo discloses a scanning optical system whose scanning lenses comprise refraction lens elements with a diffraction lens structure for compensating compensates for the lateral chromatic aberration caused by the refraction lens elements. Kamikubo further teaches the scanning optical system would include a plurality of light sources emitting lights at different wavelengths.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the refraction and diffraction lens elements as taught by Kamikubo in the device of Kitamura. Doing so would eliminate the chromatic aberration when a light source emitting a plurality of light beams of different wavelengths are used.

8. Claims 14 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Ohmori et al., as applied to claims 12, 49 above, and further in view of Kanoto et al. (U.S. 5,365,259).

Kitamura, as modified by Ohmori et al., discloses all the basic limitations of the claimed invention except for the detection optical element being made of a plastic material.

However, Kanoto et al. discloses a scanning optical device comprising a detection optical element (24c, Fig. 7) for converging the deflected laser beam toward the start of scan photosensor (11), the detection lens being disposed orthogonally relative to the deflected laser beam, and being integral to the scanning lens (24), both being made of a plastic material.

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It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide detection lens made of plastic as taught by Kanoto et al. in the modified device of Kitamura. By doing so, it is possible to provide a light and compact optical scanning device.

9. Claims 16-17, 53-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Ohmori et al. and Kamikubo, as applied to claims 12, 15, 49, 52 above, and further in view of Kanoto et al.

Kitamura, as modified by Ohmori et al. and Kamikubo, discloses all the basic limitations of the claimed invention except for the detection optical element and the scanning lens being integrally formed and being both made of a plastic material.

However, Kanoto et al. discloses a scanning optical device comprising a detection optical element (24c, Fig. 7) for converging the deflected laser beam toward the start of scan photosensor (11), the detection lens being disposed orthogonally relative to the deflected laser beam, and being integral to the scanning lens (24), both being made of a plastic material.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Kitamura, as modified by Ohmori et al. and Kamikubo, with the aforementioned teaching of Kanoto et al. By doing so, it is possible to provide a light and compact optical scanning device.

10. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura, as applied to claim 42 above, and further in view of Kanoto et al.

Kitamura discloses all the basic limitations of the claimed invention except for the detection optical element being made of a plastic material.

However, Kanoto et al. discloses a scanning optical device comprising a detection optical element (24c, Fig. 7) for converging the deflected laser beam toward the start of scan photosensor (11), the detection lens being disposed orthogonally relative to the deflected laser beam, and being integral to the scanning lens (24), both being made of a plastic material.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide detection lens made of plastic as taught by Kanoto et al. in the device of Kitamura. By doing so, it is possible to provide a light and compact optical scanning device.

11. Claims 46-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Kamikubo, as applied to claims 42, 45 above, and further in view of Kanoto et al.

Kitamura, as modified by Kamikubo, discloses all the basic limitations of the claimed invention except for the detection optical element and the scanning lens being integrally formed and being both made of a plastic material.

However, Kanoto et al. discloses a scanning optical device comprising a detection optical element (24c, Fig. 7) for converging the deflected laser beam toward the start of scan photosensor (11), the detection lens being disposed orthogonally relative to the deflected laser beam, and being integral to the scanning lens (24), both being made of a plastic material.

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It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Kitamura, as modified by Kamikubo, with the aforementioned teaching of Kanoto et al. By doing so, it is possible to provide a light and compact optical scanning device.

Allowable Subject Matter

12. Claims 1-10, 56, 63, 67, 74 are allowed.

13. The following is an examiner's statement of reasons for allowance: the primary reason for the indication of the allowability of the claimed invention is the inclusion of the limitation, in the combination as currently claimed, that the claimed multi-beam scanning optical apparatus includes a photodetector for controlling a timing of a start of scanning of the plurality of light beams by detecting at least one of the plurality of light beams deflected by the light deflector as at least one detection light beam, and wherein the timing of the start of scanning is controlled to align the centers of scanning areas of the plurality of light beams with each other on the surface to be scanned while allowing starting points of scanning of the plurality of light beams to differ from each other when the plurality of light beams have respective wavelengths that are different from each other. The combined limitations are not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Response to Arguments

14. Applicant's arguments with respect to claims 12-18, 40, 42-79 have been considered but are moot in view of the new grounds of rejection presented in this office action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (703) 308-1281. The examiner can normally be reached on T-F (8:30-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin R. Fuller can be reached on (703) 308-0079. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722, (703) 308-7724, (703) 308-7382, (703) 305-3431, (703) 305-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



HAI PHAM
PRIMARY EXAMINER

September 25, 2003